

Capacity of the Gaussian Erasure Channel

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Abstract

This paper finds the capacity of linear time-invariant additive Gaussian noise channels observed through a memoryless erasure channel. This problem requires obtaining the asymptotic spectral distribution of a submatrix of a nonnegative definite Toeplitz matrix obtained by retaining each column/row independently and with identical probability. We show that the optimum normalized power spectral density is the waterfilling solution for reduced signal-to-noise ratio.

Index Terms: Channel capacity, Gaussian channels, intersymbol interference, erasure channels, fading, random matrices, Toeplitz matrices.